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# Program Guidance

## Missouri Home Energy Auditor Certification

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### Background

Senate Bill 1181, signed into law in July 2008, establishes a Missouri income tax deduction for the cost of a home energy audit or the cost of implementing energy-efficiency recommendations contained in an energy audit or both. Missouri taxpayers may claim the tax deduction beginning with the 2009 tax year. In order to claim the tax deduction, the audit must be performed by an energy auditor certified by the Missouri Department of Natural Resources. The new law directs the Department of Natural Resources to develop criteria and requirements for certification of home energy auditors and states that the applicants shall provide the department with an application, documentation or other information the department may require. The department may establish periodic requirements for qualified home energy auditors to maintain certification, and the department shall provide successful applicants with written notice that the applicant meets the certification requirements.

The U.S. Environmental Protection Agency (EPA) requires that firms performing renovation, repair, and painting projects that disturb lead-based paint in pre-1978 homes, child care facilities and schools be certified by EPA and that they use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices, per: 40 CFR Part 745 - Lead-Based Paint Rule

The Missouri Department of Natural Resources is implementing the requirements of the new law as explained below.

### Energy Auditor Training

Individuals desiring to obtain full certification as a home energy auditor in Missouri may qualify through successful completion of a training program leading to certification by:

- Building Performance Institute (BPI) as a Certified Building Analyst.
- Residential Energy Network (RESNET) as a Certified Rater.
- MEC.
- E-TEK
- OR certification through other DNR programs.

Acceptable training programs shall include a minimum of three days of instruction that includes the following subject areas:

- **Energy Audits** - an energy audit is an inspection, survey and analysis of energy flows in a building, process or system with the objective of understanding the energy dynamics of the system under study. Typically an energy audit is conducted to seek opportunities to reduce the amount of energy input into the system without negatively affecting the output(s). When the object of study is an occupied building then reducing energy consumption while maintaining or improving human comfort, health and safety are of primary concern. Beyond simply identifying the sources of energy use, an energy audit seeks to prioritize the energy uses according to the greatest to least cost effective opportunities for energy savings.
- **Building Envelope** - buildings and their systems, analyzing building systems, An energy audit of a home may involve recording various characteristics of the building envelope including the walls, ceilings, floors, doors, windows, and skylights. For each of these components the area and resistance to heat flow (R-value) is measured or estimated. The leakage rate or infiltration of air through the building envelope is of concern which is strongly affected by window construction and quality of door seals such as weather-stripping. The audit may also assess the efficiency, physical condition, and programming of mechanical systems such as the heating, ventilation, air conditioning equipment, and thermostat.
- **Building Science** – basic components of the house shell, the water boundary - roof, siding, foundation and slab floor, the thermal boundary - areas of the house you are going to condition, continuity of the insulation, the air barrier - walls, ceilings and floors. Basics of home construction.
- **Heat Flow Principles** - types of heat transfer; conduction, convection and radiation.
- **Conduction** - transfer of heat through a substance or between substances in contact with each other, factors in conduction - difference in temperature, length of time, area in common, resistance to heat flow and conductivity; preventive measures - insulation, low insulated windows, storm windows, storm doors.
- **Convection** - transfer of heat by the movement of the heated fluid, factors in convection - volume of air, air changes per hour, heating capacity of air, difference in temperature, length of time; preventive measures - weather stripping, house wrap, caulk, and expanding foam.
- **Radiation** - transfer of heat in the form of electromagnetic energy through space, characteristics of radiation, conversion of radiated energy to heat; preventive measures- low e insulated windows, blinds and awnings.
- **Quantifying Building Energy Flows** - formulas for area, volume, resistance to heat flow and conductivity, thermal transmittance, and infiltration loss. Determining degree days,
- **Ventilation Requirements** - air quality, combustion support, moisture, moisture sources, moisture problems, reducing moisture problems.



- Heat Loss and savings calculations - thermal comfort, system and envelope efficiency, environmental conditions, fundamentals of heat loads, measurements, calculations.
- Windows and Doors - function, types, construction, U values, unintentional openings.
- Air leakage test (blower door) - using a blower door to measure air flow and locate air leaks. Applicable ASHRAE standards, conducting zonal pressure differential tests, use of a smoke pencil, determining significant misalignments of pressure and thermal boundaries and ways to mitigate them, comparing CFM readings to required ventilation rates using appropriate methodologies.
- Heating and cooling distribution system (ductwork) - measuring duct leakage, leakage to inside, leakage to outside, alternative test methods.
- Insulation - thermal boundary, types of insulation, R-Values, default R-values, problem areas, moisture, water leakage, condensation, determining the condition of the installation, correcting deficiencies.
- Health and safety (combustion) - residential heating and combustion systems, measuring carbon monoxide, spillage and draft tests, and gas supply safety.

The applicant will demonstrate competence by successful completion of a written exam and a DNR approved field exam in which the applicant successfully completes a thorough, whole-house energy audit of at least one home.

A field exam is a very important part of the certification criteria. This is an actual demonstration that the potential auditor is competent, can handle the equipment, and can obtain meaningful results. A field exam as part of certification is essential to demonstrate that the examinee has skill and proficiency.

Recertification is required every three years. The minimum recertification requirement consists of 30 hours of continuing education during the three-year period or successful completion of a written exam and a field exam. Continuing education units shall meet the standards established by BPI, RESNET, or the Department of Natural Resources.

### **Desired Training:**

The following training topics are not required for certification. However, training in one or more of these topics will assist individuals that apply for certification to perform more thorough, whole-house assessments of a home's energy use and make resulting energy-efficiency recommendations.

- Lighting - types of lighting and controls, relative energy efficiencies of lighting types, Energy Star-labeled lights and fixtures, sources of information.



- Appliance efficiency - Energy Star labeled appliances, manufacturer data, sources of information.
- Water heater, heating system and cooling system efficiencies - manufacturer data, sources of information.
- The desired areas of training will improve the performance of the auditor, but the information can be obtained by self study and does not have to be presented in a formal training session.

### **Auditor Equipment**

The department does not require certified auditors to purchase specific equipment; however, the successful auditor should have access to the following tools:

- a. Fan Assisted Whole House Pressurization Device (blower door)
- b. Combustion Analyzer
- c. Fan Assisted Duct Pressurization Device or Pressure Pan
- d. Digital Carbon Monoxide Analyzer
- e. Digital Thermometer
- f. Gas Leak Detection Device
- g. Diagnostic Smoke

The department does not require the use of any specific equipment for a Home Energy Audit. This is a recommendation list only.

### **Full Certification**

The department does not charge a fee for Missouri certification.

The department has determined that two nationally recognized training and certification organizations have training, testing and certification protocols that meet the minimum Department of Natural Resources criteria described earlier in this document. These organizations are the Building Performance Institute Inc. (BPI) and the Residential Energy Network (RESNET). The department will accept current certification by BPI as a Certified Building Analyst or RESNET as a Certified Rater as a valid Missouri Home Energy Auditor Certification.

Applicants with existing BPI or RESNET certification as described above shall complete an application form (Missouri Certified Home Energy Auditor Application, Existing BPI or RESNET certification, MO 780-2011) and provide information as prescribed by the department. Information to be provided includes but is not limited to:

Contact name and address, Existing certification information, Business information (if applicable), Proof of liability insurance (if applicable)

The application form instructs the applicant to attach several items related to operating a business. These items are required if the individual is operating their own business and not if



the applicant is the employee of another business. The applicant should attach as many of the items as are available.

If the individual seeking certification is operating their own business, they must check with the local city and county to determine whether a business license is required. The individual must check with the Secretary of State's office to determine if business name registration is required. If a license and/or business name registration are required and the individual does not have them, the department will not issue a certification.

The Missouri Business Portal, a single point of entry for business registration, filings, licenses and permits for doing business in the State of Missouri is located at:

<http://www.business.mo.gov/>

The department will review information provided and, upon satisfactory review, will provide a written notice that the applicant meets the certification requirements.

### **Other Training Programs (Institutions)**

There may be an organization, business or entity that provides or desires to provide formal training and testing for home energy auditors other than the Missouri-recognized certification. Such entities may provide information as prescribed by the Department of Natural Resources about their program for department review. The department will evaluate the program in relationship to the Energy Auditor Training Criteria and availability of Auditor Equipment described above in this document and will notify the entity whether the training and testing program may be included as a Missouri-recognized certification program. The institution training program certification will be valid for a period of three years, at which time the department will re-evaluate the institution program for renewal.

The institution or entity applying for certification based on a training program other than BPI or RESNET must submit an application (Missouri Certified Home Energy Auditor Application, Training Institution MO 780-2013). Information to be provided includes but is not limited to:

Name of the training institution, Contact person information, Name of training program, Location of training, Length of training course, Number of years the program has been offered, Frequency of training, State charter number, Availability of training equipment, Course content, Instructor information, Copy of training curriculum and description of training content, Copy of written exam, Description of field exam, Proof of liability insurance (required)

The application form instructs the applicant to attach several items related to operating a business. The business is the training institution. The applicant should attach as many of the items as are available to help establish the authenticity of the training program.

The institution seeking certification must check with the local city and county to determine whether a business license is required. The individual must check with the Secretary of State'



office to determine if business name registration is required. If a license and/or business name registration are required and the institution does not have them, the department will not issue a certification.

The Missouri Business Portal, a single point of entry for business registration, filings, licenses and permits for doing business in the State of Missouri is located at:

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## **Recertification**

Recertification is required every three years. The minimum recertification requirement will consist of 30 hours of continuing education during the three-year period or successful completion of a written exam and a field exam. Applicants desiring recertification will complete an application form and provide information as prescribed by the department. Continuing education units must be recognized by BPI, RESNET or be approved by the Department of Natural Resources.

## **Application Forms**

There is no fee for an application.

Application forms for Missouri Home Energy Auditor (DNR Approved Certification), Form MO 780-2011, Missouri Home Energy Auditor (Training Institution), Form MO 780-2013 are available on the Missouri Department of Natural Resources website:

<http://www.dnr.mo.gov/energy/residential/homeenergyaudits.htm>

You also may contact the Missouri Department of Natural Resources Division of Energy, 573-751-2254, for a paper copy of the application forms.

If you have questions regarding this guidance, please contact:

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